

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application of:

KOPER, Olga et al.

Serial No. :

Filed:

REACTIVE NANOPARTICLES AS  
DESTRUCTIVE ADSORBENTS FOR  
BIOLOGICAL AND CHEMICAL  
CONTAMINATION

Docket No. 26787C

Group Art Unit No.

Examiner:

Assistant Commissioner of Patents  
Washington, D.C. 20231

Sir:

STATEMENT IN SUPPORT OF PETITION TO  
MAKE SPECIAL UNDER M.P.E.P. § 708.02 (VIII)

1. Applicant's attorneys hereby confirm that the subject matter defined in the claims of the above-identified application has been thoroughly searched by professional searchers at the firm of TK Associates, Inc., 2001 Jefferson Davis Highway, Suite 300, Arlington, Virginia 22202. In particular, a patentability search was conducted in March, 2003 which covered the following areas: Classes 110, 210, 222, 239, 422/1-43, 423, 424/43-47, 427, 502, and 588. As part of that search, Examiner Timothy Vanoy of GAU 1754 was consulted to determine the proper areas of search.

2. Appended hereto are copies of the following references, which includes all of the references developed in the searches described above:

3,915,350	4,770,715	5,262,150	5,499,587
5,513,584	5,985,814	6,025,402	6,106,854
6,183,785	6,482,357	2003/003219	2003/0012686
2002/0037256	JP 08-325467		

09/11/2003 BSAYASI1 00000101 10658011

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3. The present invention is concerned with methods of area decontamination and mixtures for carrying out the same. Mixtures according to the invention are adapted to being placed within a container and generally comprise particles selected from the group consisting of metal oxide and metal hydroxide particles and mixtures thereof, and a propellant. The particles preferably comprise metal oxides and even more preferably MgO. It is also within the scope of the invention for the particles to comprise metal oxide composites made up of a first metal oxide at least partially coated with a second metal oxide. Methods of area decontamination generally comprise spraying the inventive mixture adjacent the desired area.

4. The following is a detailed discussion of the enclosed references which particularly points out in the manner required by 37 C.F.R. § 1.111(b) and (c) how the claimed subject matter distinguishes over the references. For ease of review, each reference is briefly discussed and salient distinctions between independent claims 1, 9, and 14 and the respective method analogue claims (independent claims 20, 24, and 25 are merely the respective method analogues of claims 1, 9, and 14) of the above application, and the references are noted. It is to be understood, however, that in many instances there are multiple distinctions between the references and the claimed invention, and that not all such distinctions have been recited.

3,915,350—This reference discloses a pressurized aerosol package containing a metal-containing catalytic mixture of the type used in catalytic heaters. The mixture may comprise chloroplatinic acid with aluminum oxide, dextrose, and triethanolamine all dissolved and mixed in water.

- a) Claims 1 and 20– The reference does not disclose metal oxide or metal hydroxide particles having a surface area of at least about 70 m<sup>2</sup>/g as presently claimed.
- b) Claims 9 and 24– The reference discloses that the metal oxide particles are used in conjunction with additional components (chloroplatinic acid, dextrose, triethanolamine) which would materially affect the basic and novel characteristics of the claimed invention.
- c) Claims 14 and 25– The reference does not disclose a non-aqueous mixture comprising particles having an average crystallite size of up to about 20 nm as presently claimed.

4,770,715–This reference is concerned with a dry particulate composition comprising activated carbon and, alternatively, additional adsorptive materials such as magnesium oxide, which can be used for control and clean up of hazardous organic spills.

- a) Claims 1 and 20–The reference does not teach metal oxide or metal hydroxide particles having surface areas of at least about 70 m<sup>2</sup>/g as presently claimed. The reference instead teaches the use of activated carbon having a high surface area.
- b) Claims 9 and 24– The reference discloses that the magnesium oxide particles are used in conjunction with additional components (activated carbon, hydrophobic polymer, alumina, silica, and magnesium silicate) which would materially affect the basic and novel characteristics of the claimed invention.

- c) Claims 14 and 25– The reference does not disclose a non-aqueous mixture comprising particles having an average crystallite size of up to about 20 nm as presently claimed.

5,262,150–This reference is concerned with an antifungus composition in dry spray form comprising at least one antifungus agent of the family of allylamines, a noncyclized silicone polymer, a mineral or organic charge and a gas propellant. The mineral charge can comprise zinc oxide and the propellant can comprise pentane.

- a) Claims 1 and 20– The reference does not disclose metal oxide or metal hydroxide particles having surface areas of at least about 70 m<sup>2</sup>/g as presently claimed. There is no teaching of the desirability to use such high surface area particles.
- b) Claims 9 and 24–The reference discloses that the zinc oxide particles are used in conjunction with additional components (allylamine antifungal agents and silicone polymers) which would materially affect the basic and novel characteristics of the claimed invention.
- c) Claims 14 and 25– The reference does not disclose a non-aqueous mixture comprising particles having an average crystallite size of up to about 20 nm as presently claimed.

5,499,587–This reference pertains to the in-situ production of a sorbent-oxide aerosol used for removing effluents from a gaseous stream. The process comprises forming an aerosol of an

effluent sorbent and a promoter in-situ in the form of ultra-fine sorbent-oxide particles preferably having a mean diameter of less than 1.5  $\mu\text{m}$  during the combustion of a hydrocarbon containing fossil fuel.

- a) Claims 1 and 20– The reference does not disclose metal oxide or metal hydroxide particles having surface areas of at least about 70  $\text{m}^2/\text{g}$  as presently claimed.
- b) Claims 9 and 24– The reference teaches that when water insoluble metal compounds such as  $\text{Ca}(\text{OH})_2$  and  $\text{CaO}$  a solubility enhancing compound is required in order to form an aqueous solution. Furthermore, the disclosed mixture utilizes a promoter compound such as a metal salt. The presence of such additional components would materially affect the basic and novel characteristics of the claimed invention.
- c) Claims 14 and 25– The mean particle diameter as taught by the reference is not to be confused with “average crystallite size” which is a distinctly different measurement. The reference does not disclose a non-aqueous mixture comprising particles having an average crystallite size of up to about 20 nm as presently claimed. In fact, water is an essential component to the disclosed composition.

5,513,584– The disclosure of this reference is very similar to the preceding ‘587 reference, as the ‘587 reference is a continuation-in-part of the present reference.

- a) Claims 1 and 20– The reference does not disclose metal oxide or metal hydroxide particles having surface areas of at least about 70  $\text{m}^2/\text{g}$  as presently claimed.

- b) Claims 9 and 24– The reference teaches that when water insoluble metal compounds such as  $\text{Ca}(\text{OH})_2$  and  $\text{CaO}$  a solubility enhancing compound is required in order to form an aqueous solution. Furthermore, the disclosed mixture comprises a hydrocarbon-containing fossil fuel. The presence of such additional components would materially affect the basic and novel characteristics of the claimed invention.
- c) Claims 14 and 25– The reference does not disclose a non-aqueous mixture comprising particles having an average crystallite size of up to about 20 nm as presently claimed. In fact, water is an essential component to the disclosed composition.

5,985,814– The reference discloses an acaricidal carpet cleaning composition containing an anionic detergent, an ethoxylated glycerol type compound, a hydrocarbon ingredient, at least one cosurfactant, an acaricidal agent, and water. The composition may also include an inorganic oxide of a multivalent metal cation.

- a) Claims 1 and 20– The reference does not disclose metal oxide or metal hydroxide particles having surface areas of at least about  $70 \text{ m}^2/\text{g}$  as presently claimed.
- b) Claims 9 and 24– As noted above, the disclosed composition comprises a multitude of additional components, the presence of which would materially affect the basic and novel characteristics of the claimed invention.
- c) Claims 14 and 25– The reference does not disclose a non-aqueous mixture comprising particles having an average crystallite size of up to about 20 nm as

presently claimed. In fact, water is an essential component to the disclosed composition.

6,025,402– A composition is disclosed for effectuating a complex detoxification of fumes, chemical fogs, and a reduction of visibility obscuration caused by fumes. The composition includes two chemical nucleators for cooling and rapid condensation of water vapors, two oxides for converting CO to CO<sub>2</sub>, and two clathrates in aqueous solution for inclusion complexation of primary toxic gases.

- a) Claims 1 and 20– The reference does not disclose metal oxide or metal hydroxide particles having surface areas of at least about 70 m<sup>2</sup>/g as presently claimed.
- b) Claims 9 and 24– The disclosed composition comprises a multitude of additional components (a saline aqueous solution of cyclodextrins, and metal iodides), the presence of which would materially affect the basic and novel characteristics of the claimed invention.
- c) Claims 14 and 25– The reference does not disclose a non-aqueous mixture comprising particles having an average crystallite size of up to about 20 nm as presently claimed. As noted above, one essential ingredient is an aqueous solution of cyclodextrin compounds.

6,106,854– This reference discloses a disinfectant composition for application to surfaces or water will destroy viruses, bacteria, fungi, and parasites. The composition comprises a germicidal

or antiseptic agent, a water purifying agent, a cleansing agent, an anti-oxidant and stablizer agent, a scrubbing agent (e.g. ZnO, or MgO), at least one pH adjuster, and a diluent.

- a) Claims 1 and 20– The reference does not disclose metal oxide or metal hydroxide particles having surface areas of at least about 70 m<sup>2</sup>/g as presently claimed.
- b) Claims 9 and 24– As noted above, the disclosed composition comprises a multitude of additional components, the presence of which would materially affect the basic and novel characteristics of the claimed invention.
- c) Claims 14 and 25– The reference does not disclose a non-aqueous mixture comprising particles having an average crystallite size of up to about 20 nm as presently claimed.

6,183,785– The reference discloses a composition for application to the teat of a milk producing animal in order to prevent mastitis. The composition comprises a source of zinc (possibly zinc oxide), a disinfectant component such as chlorhexidine or a salt thereof, a liquid carrier such as water or alcohol, and optionally an emollient or dye.

- a) Claims 1 and 20– The reference does not disclose metal oxide or metal hydroxide particles having surface areas of at least about 70 m<sup>2</sup>/g as presently claimed.
- b) Claims 9 and 24– The disclosed composition comprises a disinfectant agent such as chlorhexidine and optionally a number of other components, the presence of which would materially affect the basic and novel characteristics of the claimed invention.



- c) Claims 14 and 25– The reference does not disclose a non-aqueous mixture comprising particles having an average crystallite size of up to about 20 nm as presently claimed.

6,482,357– The reference discloses a method for denaturing or deactivating an airborne allergen by providing a liquid composition which includes an allergen denaturant or deactivant. A possible allergen deactivant is a composite of AgCl and TiO<sub>2</sub>. The composition is preferably a water and hydrocarbon mixture which is sprayed into the air using an aerosol spray device. The resulting aerosol droplets have a charge to mass ratio of at least  $\pm 1 \times 10^{-4}$  C/kg.

- a) Claims 1 and 20– The reference does not disclose metal oxide or metal hydroxide particles having surface areas of at least about 70 m<sup>2</sup>/g as presently claimed.
- b) Claims 9 and 24– The only metal oxide disclosed in the reference is a composite also including AgCl. The presence of AgCl would materially affect the basic and novel characteristics of the claimed invention. In addition, preferred embodiments of the disclosed composition include an oil phase which comprises a C9-C12 hydrocarbon, and also a surfactant.
- c) Claims 14 and 25– The reference does not disclose a non-aqueous mixture comprising particles having an average crystallite size of up to about 20 nm as presently claimed.

2003/003219– Does not constitute prior art under 35 U.S.C. 102.

2003/0012686– Does not constitute prior art under 35 U.S.C. 102.

2002/0037256– Does not constitute prior art under 35 U.S.C. 102.

JP 08-325467 (English abstract) – The reference discloses an aerosol composition which has some antibacterial activity when spray coated onto a particular surface. The composition comprises a water-ethanol solution, an amount of colloidal particles having an average particle diameter of 5-20 nm, an amount of a water-soluble polymer composition, and a hydrophilic organic solvent.

- a) Claims 1 and 20– The reference does not disclose metal oxide or metal hydroxide particles having surface areas of at least about 70 m<sup>2</sup>/g as presently claimed.
- b) Claims 9 and 24– The disclosed composition comprises a number of materials which would materially affect the basic and novel characteristics of the claimed invention, such as a water-soluble polymer composition.
- c) Claims 14 and 25– The reference does not disclose a non-aqueous mixture comprising particles having an average crystallite size of up to about 20 nm as presently claimed. In fact, water is an essential component to the disclosed aerosol stock solution.

5. As described above, all of the references developed during the patentability searching, alone or in combination, fail to describe or suggest the invention as recited in the claims of the above-identified application. Accordingly, unless more pertinent art is located than that discovered during Applicant's preliminary searching, all claims are allowable.

Respectfully submitted,

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